Arch Sex Behav (2009) 38:364–377
DOI 10.1007/s10508-008-9424-z

ORIGINAL PAPER

Eating and Body Image Disturbances in Male-to-Female and Female-to-Male Transsexuals

Silja Vocks · Catharina Stahn · Kerstin Loenser · Tanja Legenbauer

Received: 6 October 2006 / Revised: 30 April 2008 / Accepted: 7 July 2008 / Published online: 22 November 2008

Abstract The aim of the study was to discover whether persons with Gender Identity Disorder (GID) differed from controls of both sexes and from persons with eating disorders in terms of the degree of eating and body image disturbance, self-esteem, and depression. A total of 88 self-identified male-to-female transsexuals (MtF), 43 female-to-male transsexuals (FtM), 62 females with an eating disorder, 56 male controls, and 116 female controls completed the Eating Disorder Examination Questionnaire, Eating Disorder Inventory, Body Checking Questionnaire, Drive for Muscularity Scale, Rosenberg Self-Esteem Scale, and Beck Depression Inventory. MtF showed higher scores on restrained eating, eating concerns, weight concerns, shape concerns, drive for thinness, bulimia, body dissatisfaction, and body checking compared to male controls, and concerning some variables also compared to female controls. FtM displayed a higher degree of restrained eating, weight concerns, shape concerns, body dissatisfaction, and body checking compared to male controls. Furthermore, participants with GID showed higher depression scores than did controls, whereas no differences concerning drive for muscularity and self-esteem were found. Between MtF and FtM, the only significant difference emerged for body checking, with MtF displaying higher scores. Although it was shown that on these variables the values for persons with GID were lower than for those with eating disorders, these data lead us to speculate that persons with GID might be at a higher risk of eating disturbances. Therefore, the implementation of prevention programs might help persons with GID to avoid developing a clinically relevant eating disorder.

Keywords Gender identity disorder · Transsexualism · Body image disturbances · Eating disorder

S. Vocks (✉) · C. Stahn · K. Loenser
Department of Psychology, Clinical Psychology and Psychotherapy, Ruhr-University Bochum, Universitätsstrasse 150, 44780 Bochum, Germany
e-mail: silja.vocks@ruhr-uni-bochum.de

T. Legenbauer
Department of Psychology, Johannes Gutenberg University, Mainz, Germany

Introduction

Gender Identity Disorders (GID) are characterized by a persistent discomfort with one's own sex and a stated desire to be the other sex. Persons with GID experience a sense of inappropriateness in the gender role of their own biological sex, which is manifested by symptoms such as a preoccupation with getting rid of primary and secondary sex characteristics, and the request for hormones or surgery to physically alter sexual characteristics in order to feminize or masculinize their bodies to approximate those of the other sex (American Psychiatric Association, 2000).

Due to the dissonance between the anatomic and the desired sex, transsexual individuals of both sexes might evaluate their own body more negatively than non-transsexual persons. Nevertheless, body image disturbances in individuals with GID have only rarely been addressed empirically. In one of the few existing studies, it was found that persons with GID of both sexes were more body dissatisfied than non-transsexual individuals (Pauly & Lindgren, 1976/1977). It was shown that the sexual anatomy was an obvious source of dissatisfaction, but the dissatisfaction was directed more broadly towards non-sex-related regions and aspects of the body, such as the feet, face, nose, height, eyebrows, hands, chin and shoulders, i.e., hormonally unresponsive body parts. Since body image disturbances play a significant role in the

development and maintenance of eating disorders (Fairburn et al., 2003; Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004; Keel, Dorer, Franko, Jackson, & Herzog, 2005; Stice, 2002), it could be assumed that persons with GID might change their eating behavior as a strategy to modify their body and might, therefore, be at an enhanced risk for developing symptoms of anorexia or bulimia nervosa. However, no empirical investigation has yet addressed this issue.

The only hints at a possible coexistence of GID and eating disorder symptomatology can be derived from published single case studies. It was hypothesized that, for male-to-female transsexuals (MtF), slimness was a way to respond to the female ideal of attractiveness, since the individuals often strive to be a "super female" and therefore tend to accentuate female traits (Hepp & Milos, 2002). Thus, being slim might be put on a par with being female and attractive (Waters, 1998). The occurrence of anorexia and bulimia nervosa has also been described in single case studies for female-to-male transsexuals (FtM) (Fernandez-Aranda et al., 2000; Hepp & Milos, 2002). Hepp and Milos (2002) hypothesized that slimness might be regarded as a possibility to suppress secondary sexual characteristics (e.g., the breasts) and menstruation. On the other hand, it might be speculated that FtM may be overweight and reluctant to lose weight so as to avert sexual attraction from men for being a woman or to make their breast and hip size appear less prominent relative to their abdominal size. These case reports provide first hints that transgenderism might be a risk factor for the development of an eating disorder.

The first aim of the present study was to systematically compare self-identified MtF and FtM with male and female controls concerning disturbances in eating behaviors and body image. In order to examine differences between the participants with GID and another clinical group, we also included females with eating disorders, since these persons are characterized not only by problematic eating behavior, but also by severe disturbances in body image (e.g., Cash & Deagle, 1997). Because, in general, females seem to be predominantly dissatisfied with their own body weight, whereas males' disparagement of their own appearance is mainly related to muscularity (Olivardia, 2001, 2002), we will not only assess the subjective importance and evaluation of one's own body weight and shape in the form of slimness, but will also consider drive for muscularity. Beyond comparing participants with GID and controls, we also wanted to assess differences between MtF and FtM in the magnitude of disturbances in eating behavior and body image. In the general population, females are more body dissatisfied than males (Garner, 1997) and their risk of developing anorexia and bulimia nervosa is approximately ten times higher (Hoek & van Hoeken, 2003). For this reason, and due to the fact that a normal male body is more difficult to pass off as a female one than the other way round (Pauly & Lindgren, 1976/1977), and male attributes are more accepted in females than female attributes in males (Kraemer, Delsignore, Schnyder, & Hepp, 2008), we hypothesized that MtF might display eating and body image disturbances to a higher degree compared to FtM. Since the findings concerning the general psychopathology among persons with GID are controversial (for an overview, see Cohen, de Ruiter, Ringelberg, & Cohen-Kettenis, 1997), we additionally wanted to compare FtM and MtF with female and male controls and females with eating disorders in terms of self-esteem and depression.

Since previous research has found relationships among lower self-esteem and depression on the one hand, and body dissatisfaction and eating pathology on the other, both in the general population and among patients with eating disorders (e.g., Davison & McCabe, 2006; Dobmeyer & Stein, 2003; Dunkley & Grilo, 2007; Freedman, 1990; Taylor & Cooper, 1992; Tomori & Rus-Makovec, 2000), a second aim of the present study was to employ exploratory analyses to examine whether eating disturbance and body image measures were correlated with a general index of adjustment among MtF and FtM.

Third, in additional exploratory analyses, we investigated whether measures of eating disorders and body image correlate with age and Body Mass Index (BMI) among MtF and FtM, as previous research revealed that in non-transsexual individuals, a lower age and a higher BMI were associated with more pronounced shape concerns and body dissatisfaction, respectively (e.g., Hospers & Jansen, 2005; Tiggeman, 2004).

Finally, we examined whether the number of stages undergone in the transsexual development was associated with the extent of eating and body image disturbances. Since previous research has demonstrated that gender reassignment surgery was able to enhance body satisfaction in individuals with GID due to a reduction in the discrepancy between biological and desired sex (Kraemer et al., 2008; Pauly & Lindgren, 1976/1977), we hypothesized that the higher the number of stages undergone, the lower the eating and body image disturbances.

Method

Participants

In total, 356 participants were included in the present study, of whom 88 were self-identified MtF and 43 FtM. Participants with GID were recruited via self-help groups, counseling centers, and clinics for persons with GID in Germany, Austria, and Switzerland. The clinical comparison group consisted of 62 females with various forms of eating disturbances (Anorexia Nervosa, $n = 16$; Bulimia Nervosa, $n = 21$; Eating Disorder Not Otherwise Specified, $n = 25$).

The females with eating disorders were recruited from the waiting list of the Centre for Psychotherapy at the Ruhr University of Bochum, Germany and the Centre for Psychotherapy at the Johannes-Gutenberg-University of Mainz. Non-transsexual controls consisted of 56 males and 107 females who voluntarily answered the questionnaires. This group mainly consisted of persons recruited from university seminars and the city council. None of the participants were paid for taking part in the study. Participants could choose whether to answer the questionnaires in a paper-and-pencil version or online, since various studies have shown that the two answering methods reveal comparable results and do not differ in psychometric properties (Eisen, Toche-Manley, & Grissom, 2004; Fouladi, McCarthy, & Moller, 2002; Riva, Teruzzi, & Anolli, 2003). A total of 82 participants from the MtF group, 37 from the FtM group, 23 from the male control group, and 42 from the female control group answered the questionnaires via the Internet. The other parts of the groups and the participants with eating disorders completed the questionnaires in a paper-and-pencil version.

Measures

Eating Disorder Examination Questionnaire

The four subscales Restraint, Eating Concern, Weight Concern, and Shape Concern of the Eating Disorder Examination Questionnaire (Fairburn & Cooper, 1993; Hilbert, Tuschen-Caffier, Karwautz, Niederhofer, & Munsch, 2007) were used in order to assess relevant characteristics of eating disorders which occurred within the past 28 days. The Restraint scale consists of five items (e.g., "Over the past 4 weeks, have you wanted your stomach to be empty? Has this been to influence your shape and weight?"). The Eating Concern scale consists of five items (e.g., "Over the past 4 weeks, have you eaten in secret?"). The subscale Weight Concern consists of five items (e.g., "Over the past 4 weeks, have you been dissatisfied with your weight? Have you been so dissatisfied that it has made you unhappy?"). The Shape Concern scale consists of eight items (e.g., "Over the past 4 weeks, have you been dissatisfied with your shape? Have you been so dissatisfied that it has made you unhappy?"). Each item was scored on a 7-point scale, ranging from 0 (= *attribute was not present*) to 6 (= *attribute was present every day*). Internal consistencies of the subscales were rather good, with Cronbach's alpha ranging from $\alpha = .76$ to $\alpha = .93$. Test–retest reliability varied from $r_{tt} = .68$ to $r_{tt} = .74$.

Eating Disorder Inventory

The subscales Drive for Thinness, Bulimia and Body Dissatisfaction from the Eating Disorder Inventory-2 (Garner, 1991; Paul & Thiel, 2005) were administered to the participants. These subscales include fear of getting fat, thoughts about diet and weight, binge eating behavior, and the evaluation of one's own body as negative. The Drive for Thinness scale consists of seven items (e.g., "I eat sweets and carbohydrates without feeling nervous."). The Bulimia scale includes seven items (e.g., "I eat when I am upset."). The Body Dissatisfaction scale consists of nine items (e.g., "I think that my stomach is too big."). Each item was scored on a 6-point scale, ranging from 1 (= *never*) to 6 (= *always*). Internal consistencies for the above-mentioned subscales ranged from $\alpha = .73$ to $\alpha = .94$ for different samples. Test–retest reliability lies between $r_{tt} = .86$ and $r_{tt} = .94$ for an intervening period of 7 days (Paul & Thiel, 2005).

Body Checking Questionnaire

In order to measure the behavioral manifestation of a negative body image, participants completed the Body Checking Questionnaire (Reas, Whisenhunt, Netemeyer, & Williamson, 2002; Vocks, Moswald, & Legenbauer, 2008). Using 23 items, it assesses behaviors that are used to check for signs of weight gain and overweight (e.g., "I check my reflection in glass doors or car windows to see how I look."). Each item was scored on a 5-point scale from 1 (= *never*) to 5 (= *very often*). The internal consistency for the general score ranges from $\alpha = .84$ to $\alpha = .92$ and the test-retest reliability is $r_{tt} = .91$ with an intervening period of two weeks.

Drive for Muscularity Scale

The Drive for Muscularity Scale[1] (McCreary & Sasse, 2000) measures attitudes and behavior regarding one's looks and muscularity with 15 items (sample item: "I wish that I were more muscular."). The items were scored on a 6-point scale from 1 (= *never*) to 6 (= *always*). Higher scores indicate a greater drive for muscularity. The internal consistency of the general score is between $\alpha = .81$ and $\alpha = .88$. The retest-reliability is $r_{tt} = .84$ (Cafri & Thompson, 2004; McCreary & Sasse, 2000).

Rosenberg Self-Esteem Scale

Self-esteem was measured using the Rosenberg Self-Esteem Scale (Ferring & Filipp, 1996; Rosenberg, 1965). This inventory consists of 10 items measuring different aspects of self-esteem (sample item: "I feel that I'm a person of worth at least on an equal plane with others."). Each item was scored on a 4-point scale from 0 (= *never applies to me*) to 3 (= *always applies to me*). The internal consistency of this questionnaire ranges from $\alpha = .81$ to $\alpha = .88$ for various samples and the test-retest reliability is indicated to be $r_{tt} = .88$.

[1] Data were not assessed for each of the five groups.

Table 1 Summary of normative data for the questionnaires used in the present study

Questionnaire		Healthy females	Healthy males	References
Eating Disorder Examination-Questionnaire				
		$n = 409$	–	Hilbert et al. (2007)
Restraint	*M*	1.27	–	
	SD	1.33	–	
Eating concern	*M*	0.76	–	
	SD	1.08	–	
Weight concern	*M*	1.66	–	
	SD	1.42	–	
Shape concern	*M*	2.08	–	
	SD	1.61	–	
Eating Disorder Inventory-2				
		$n = 186$	$n = 102$	Paul and Thiel (2005)
Drive for Thinness	*M*	17.30	12.80	
	SD	6.80	4.90	
Bulimia	*M*	10.60	9.70	
	SD	3.40	2.80	
Body Dissatisfaction	*M*	30.20	21.60	
	SD	10.30	7.90	
		$n = 202$	$n = 64$	Vocks, Moswald, et al. (2008)
Body Checking Questionnaire	*M*	0.76	0.42	
	SD	0.47	0.29	
		$n = 103$	$n = 76$	Cafri and Thompson (2004)
Drive for Muscularity Scale	*M*	71.52	59.95	
	SD	9.60	13.35	
		$n = 87$		Ferring and Filipp (1996)
Rosenberg Self-Esteem Scale	*M*	22.90		
	SD	4.40		
		$n = 113$	$n = 40$	Coughlin et al. (2008); Errico, King, and Parsons (1991)
Beck Depression Inventory	*M*	6.20	5.60	
	SD	6.90	6.20	

Note: Dashes indicate that there are no data available

Beck Depression Inventory

In order to measure the degree of depression, the Beck Depression Inventory (BDI; Beck & Steer, 1987; Hautzinger, Bailer, Worrall, & Keller, 2000) was administered. The BDI contains 21 items that describe typical depressive symptoms (sample item: "I am so sad and unhappy that I can't stand it"). Each item was scored on a 4-point scale from 0 (= *attribute not present*) to 3 (= *strong occurrence*). The internal consistency of the BDI has proven to be sufficiently high, varying between $\alpha = .74$ and $\alpha = .88$ in various samples. The test-retest reliability of the BDI is $r_{tt} = .75$ for one week and $r_{tt} = .68$ for two weeks (Hautzinger et al., 2000). The following norms have been established for this questionnaire: Scores below 9 are regarded as healthy, and scores between 11 and 17 are viewed as slightly increased. In the clinical range, significant depressive symptoms are numerically expressed by values between 18 and 20 and depressive patients show values over 20.

The normative data of the questionnaires used in the present study are provided in Table 1.

Results

Sample Characteristics

Data on age, height, weight, BMI, marital status, current partnership, and educational level within the five groups are shown in Table 2.

A one-way analysis of variance (ANOVA) revealed no significant differences in age between the five groups (Table 2). As expected, the one-way ANOVA indicated significant group differences with respect to height, weight, and BMI. The post-hoc Dunnett-T3 test for body height showed that MtF were taller than FtM, female controls, and females with eating disorders. FtM were shorter than male controls, but taller than female controls. In terms of body weight, MtF

Table 2 Sample characteristics

Variable		Male-to-female transsexuals ($n = 88$)	Female-to-male transsexuals ($n = 43$)	Females with eating disorders ($n = 62$)	Male controls ($n = 56$)	Female controls ($n = 107$)	Group comparison		
							F	df	p
Mean age (in years)	*M*	37.27	34.95	33.68	34.77	32.80	2.09	4	.082
	SD	11.18	7.99	6.05	12.91	13.22			
Mean height (in cm)	*M*	177.42[b,c,e]	171.98[a,d,e]	168.27[a,d]	180.48[a,c,e]	167.58[a,b,d]	46.76	4	<.001
	SD	8.46	8.59	5.49	6.77	6.05			
Mean weight (in kg)	*M*	78.43[c,e]	72.79[c,d,e]	54.63[a,b,d,e]	82.59[b,c,e]	63.90[a,b,c,d]	49.15	4	<.001
	SD	16.23	16.32	7.58	10.94	12.34			
Mean Body Mass Index (kg/m^2)	*M*	24.83[c,e]	24.53[c]	19.30[a,b,d,e]	25.35[c,e]	22.75[a,c,d]	24.58	4	<.001
	SD	4.45	4.79	2.68	3.07	4.08			
Number of married participants		18 (21%)	8 (19%)	–	18 (33%)	37 (35%)	$\chi^2 = 7.52$	3	.057
Number of participants with a current partnership		41 (47%) (20% with a male)	22 (51%) (9% with a male)	–	–	Not assessed	$\chi^2 = .242$	1	.710
Years of school education[f]							$H = 24.25$	4	<.001
Number of participants with 9 years[g]		11[c,e] (13%)	3[c] (7%)	7[a,b,d,e] (23%)	4[c] (7%)	9[a,c] (8%)			
Number of participants with 10 years[h]		23[c,e] (27%)	11[c] (26%)	15[a,b,d,e] (50%)	14[c] (25%)	18[a,c] (17%)			
Number of participants with 13 years[i]		52[c,e] (60%)	29[c] (67%)	8[a,b,d,e] (27%)	38[c] (68%)	80[a,c] (75%)			

Note: Dashes indicate that data were not assessed. A Dunnett-T3 test was used as post-hoc test

[a] Differs significantly from male-to-female transsexuals ($p < .05$)

[b] Differs significantly from female-to-male transsexuals ($p < .05$)

[c] Differs significantly from females with eating disorders ($p < .05$)

[d] Differs significantly from male controls ($p < .05$)

[e] Differs significantly from female controls ($p < .05$)

[f] For 51.6% of participants with eating disorders, school education was not assessed

[g] German lower-track school level

[h] German medium-track school level

[i] German higher-track school level

were heavier than female controls and females with eating disorders. FtM were lighter than male controls, but heavier than female controls and females with eating disorders. With regard to BMI, post-hoc comparisons revealed that MtF had a higher BMI than female controls and females with eating disorders. FtM also had a higher BMI compared to females with eating disorders. Concerning marital status and current partnership, the group comparisons using a χ^2 test failed to reach statistical significance (see footnote 1). For the years of school education, groups differed significantly from each other in the Kruskall–Wallis *H* test. Pairwise post-hoc comparisons using the Mann–Whitney *U* test indicated that MtF and FtM had a significantly higher school education than females with eating disorders. Furthermore, a significant difference was detected between MtF and female controls with female controls having a higher educational level. The results concerning the comparison of the female and male control group and the participants with eating disorders are presented in Table 2.

Descriptive information concerning the stages of transsexual development such as wearing clothes of the target sex, change of name, hormonal treatment, and operation of genitals undergone by the MtF and FtM participants were assessed using selected and partly modified items from the Düsseldorf Questionnaire on Transidentity (M. Söder, 1998, unpublished manuscript). It was assessed whether or not each participant had undergone each stage, the age at which each stage was reached, and the time that had since elapsed (see Table 3).

Table 3 Comparison of the male-to-female transsexuals and female-to-male transsexuals concerning the stages of transsexual development

		Male-to-female transsexuals ($n = 88$)	Female-to-male transsexuals ($n = 43$)	Group comparison		
				Statistics	*df*	*p*
Wearing clothes of target sex						
Number		73 (83%)	37 (86%)	FET	–	ns
Onset age	*M*	25.74	17.97	$t = 2.94$	109	ns
	SD	13.79	11.68			
	Range	3–58	1–46			
Years passed	*M*	13.15	17.03	$t = -1.95$	109	.054
	SD	9.85	10.02			
	Range	0–38	0–42			
Change of name						
Number		32 (36%)	20 (47%)	FET	–	ns
Onset age	*M*	36.72	31.75	$t = 1.72$	50	.092
	SD	10.94	8.75			
	Range	20–61	19–47			
Years passed	*M*	3.84	3.50	$t = 0.30$	49.81	ns
	SD	5.20	3.02			
	Range	0–18	0–10			
Hormonal treatment						
Number		50 (57%)	26 (61%)	FET	–	ns
Onset age	*M*	35.22	30.73	$t = 2.09$	67.31	.041
	SD	10.89	7.65			
	Range	19–59	19–45			
Years passed	*M*	4.04	3.38	$t = 0.64$	74	ns
	SD	4.64	3.24			
	Range	0–19	0–11			
Operation of genitals						
Number		16 (18%)	14 (33%)	FET	–	.079
Onset age	*M*	36.77	30.07	$t = 1.38$	29	ns
	SD	10.49	9.40			
	Range	20–53	20–48			
Years passed	*M*	5.18	3.07	$t = 1.21$	29	ns
	SD	5.70	3.45			
	Range	0–18	0–10			

A comparison of the two groups with GID indicated that MtF and FtM did not differ concerning having undergone the stages wearing clothes of the target sex, change of name, hormonal treatment, and operation of genitals. Whereas FtM were slightly younger when starting with hormonal treatment compared to MtF, no further differences were found between the two groups with GID concerning onset age of the respective stage and the number of years that had elapsed since the stage was reached.

Group Comparisons

Complete results of the one-way ANOVA comparing the five groups and of the additional Dunnett-T3 tests are presented in Table 4.

Eating Disorder Examination Questionnaire

For each of the four subscales of the Eating Disorder Examination Questionnaire, significant differences between the five groups were found. On the Restraint scale, the post-hoc analyses showed that MtF had higher scores than male controls (effect size: Hedges' $g = .72$; Hedges & Olkin, 1985) and significantly lower scores compared to females with eating disorders ($g = 1.39$). For the FtM, the Dunnett-T3 test revealed that they had higher scores compared to the male controls ($g = .76$), but lower scores than the females with eating disorders ($g = 1.51$).

On the Eating Concern scale, post-hoc tests showed that MtF had higher scores than male controls ($g = .73$), but lower scores than females with eating disorders ($g = 1.95$). FtM had significantly lower scores on the Eating Concern scale than the females with eating disorders ($g = 2.00$).

On the Weight Concern scale, the post-hoc tests showed that MtF had significantly higher scores when compared to male controls ($g = .91$) and female controls ($g = .58$), but significantly lower scores when compared to females with eating disorders ($g = 1.42$). Furthermore, FtM scored higher on this subscale than male controls ($g = .83$) and lower than FtM ($g = 1.69$).

On the Shape Concern scale, MtF had significantly higher scores than male controls ($g = 1.01$) and female controls ($g = .64$), but lower scores compared to females with eating disorders ($g = 1.28$). FtM also showed significantly higher scores on this subscale than male controls ($g = .84$), but lower scores than FtM ($g = 1.61$).

Eating Disorder Inventory

For each of the three administered Eating Disorder Inventory subscales, significant differences were found between the five groups. On the Drive for Thinness scale, post-hoc analyses showed that MtF had significantly higher scores compared to male controls ($g = .83$), but significantly lower scores than the females with eating disorders ($g = 1.65$). FtM had lower scores compared to females with eating disorders FtM ($g = 1.92$).

On the Bulimia scale, post-hoc analyses showed that MtF had higher values than male controls ($g = .57$) and lower scores than females with eating disorders ($g = 1.07$). FtM also showed lower scores than females with eating disorders ($g = 1.16$).

On the Body Dissatisfaction scale, post-hoc analyses showed that MtF had significantly higher scores than male controls ($g = .97$) and female controls ($g = .46$), but lower scores compared to females with eating disorders ($g = 1.05$). Additionally, FtM had higher scores than male controls ($g = .74$). FtM showed lower scores than females with eating disorders ($g = 1.16$).

Body Checking Questionnaire

For the general score of the Body Checking Questionnaire, a significant group difference was found. The post-hoc analyses showed that MtF had higher scores on the Body Checking Questionnaire than FtM ($g = .54$), male controls ($g = 1.05$), and female controls ($g = .47$), but lower scores compared to females with eating disorders ($g = .67$). FtM also had higher scores compared to male controls ($g = .65$), but lower scores than females with eating disorders ($g = 1.26$).

Drive for Muscularity Scale

On the Drive for Muscularity Scale, a significant group difference was found between male controls and female controls, but neither MtF nor FtM differed from the controls or from each other.

Rosenberg Self-Esteem Scale

For the Rosenberg Self-Esteem Scale, a significant group difference between the five groups was found. Post-hoc analyses showed that MtF ($g = 1.17$) and FtM ($g = 1.21$) had higher cumulative scores than females with eating disorders.

Beck Depression Inventory

On the Beck Depression Inventory, significant group differences were found. Post-hoc analyses showed that MtF had higher scores compared to the control groups of both sexes (male controls: $g = .80$; female controls: $g = .68$), but lower scores than females with eating disorders ($g = .81$). Furthermore, FtM showed higher depression scores than male controls ($g = .67$), but lower scores compared to females with eating disorders ($g = .99$).

Table 4 Comparison of the five groups using a one-way ANOVA regarding measures on eating and body image disturbance, self-esteem and depression

Variable		Male-to-female transsexuals ($n = 88$)	Female-to-male transsexuals ($n = 43$)	Females with eating disorders ($n = 62$)	Male controls ($n = 56$)	Female controls ($n = 107$)	Group comparison		
							F	*df*	*p*
Eating Disorder Examination Questionnaire									
Restraint	*M*	1.59[c,d]	1.51[c,d]	3.74[a,b,d,e]	0.61[a,b,c,e]	1.22[c,d]	45.69	4	<.001
	SD	1.64	1.60	1.41	0.73	1.32			
Eating concern	*M*	0.80[c,d]	0.60[c]	3.04[a,b,d,e]	0.23[a,c,d]	0.53[c,d]	88.87	4	<.001
	SD	0.98	1.01	1.35	0.28	0.87			
Weight concern	*M*	2.19[c,d,e]	1.97[c,d]	4.15[a,b,d,e]	1.04[a,b,c]	1.41[a,c]	57.92	4	<.001
	SD	1.45	1.33	1.27	0.91	1.26			
Shape concern	*M*	2.74[c,d,e]	2.42[c,d]	4.54[a,b,d,e]	1.31[a,b,c]	1.77[a,c]	50.68	4	<.001
	SD	1.56	1.51	1.17	1.15	1.47			
Eating Disorder Inventory									
Drive for Thinness	*M*	2.80[c,d]	2.50[c]	4.56[a,b,d,e]	1.96[a,c,e]	2.52[c,d]	54.94	4	<.001
	SD	1.17	1.29	0.90	0.70	1.08			
Bulimia	*M*	1.84[c,d]	1.62[c]	2.96[a,b,d,e]	1.42[a,c]	1.69[c]	29.56	4	<.001
	SD	0.85	0.94	1.28	0.52	0.72			
Body Dissatisfaction	*M*	3.64[c,d,e]	3.46[c,d]	4.71[a,b,d,e]	2.70[a,b,c,e]	3.15[a,c,d]	33.91	4	<.001
	SD	1.12	1.34	0.86	0.71	1.03			
Body Checking Questionnaire	*M*	1.20[b,c,d,e]	0.80[a,c,d]	1.76[a,b,d,e]	0.49[a,b,c,e]	0.88[a,c,d]	31.39	4	<.001
	SD	0.81	0.58	0.87	0.38	0.55			
Drive for Muscularity Scale	*M*	23.68	27.44	–	28.21[e]	21.07[d]	8.391	3	<.001
	SD	9.37	15.21	–	10.97	6.14			
Rosenberg Self-Esteem Scale	*M*	29.39[c]	29.81[c]	21.85[a,b,d,e]	30.39[c]	30.07[c]	20.44	4	<.001
	SD	6.57	7.09	6.20	6.15	6.20			
Beck Depression Inventory	*M*	11.49[c,d,e]	9.67[c,d]	19.53[a,b,d,e]	5.00[a,b,c]	6.03[a,c]	28.50	4	<.001
	SD	9.71	9.26	10.49	4.55	6.21			

Note: Dashes indicate that the data were not assessed. A Dunnet-T3 test was used as post-hoc test

[a] Differs significantly from male-to-female transsexuals ($p < .05$)

[b] Differs significantly from female-to-male transsexuals ($p < .05$)

[c] Differs significantly from females with eating disorders ($p < .05$)

[d] Differs significantly from male controls ($p < .05$)

[e] Differs significantly from female controls ($p < .05$)

Furthermore, we divided each of the five groups into two subgroups according to whether the participants score higher or lower than the critical value of 18 (Hautzinger et al., 2000; see above) on the Beck Depression Inventory. Data indicate that 24% of MtF, 16% of FtM, 0% of male controls, 7% of female controls, and 55% of the females with eating disorders had clinically relevant depression scores. The χ^2 test revealed a significant difference between the five groups regarding this variable, $\chi^2(4) = 37.57, p < .001$.

Correlations between General Adjustment and Measures of Body Image and Eating Disturbances

In order to obtain a general adjustment index, the data of the Rosenberg Self-Esteem Scale and the Beck Depression Inventory were *z*-transformed and the scores of the Beck Depression Inventory were reversed. Afterwards, the mean of these values was computed. For the MtF, a significant correlation (Pearson coefficient) between the general adjustment index on the one hand and the four subscales of the Eating Disorder Examination Questionnaire (Restraint, Eating Concern, Weight Concern, and Shape Concern), the three subscales of the Eating Disorder Inventory (Drive for Thinness, Bulimia and Body Dissatisfaction) and the Body Checking Questionnaire on the other was found. These data indicate that the higher the general adjustment, the lower the body image and eating disturbance. For the FtM, no such relationships were found (Table 5).

Correlations between Age and Measures of Body Image and Eating Disturbances

For the MtF, Pearson correlations showed significant relationships between age and the Restraint scale of the Eating Disorder Examination Questionnaire and the Drive for Muscularity Scale, indicating that the older the participants were, the less restrained their eating behavior was and the less they strove for muscularity. For the FtM, significant associations between age and the Body Dissatisfaction scale of the Eating Disorder Inventory and the Drive for Muscularity Scale were found, indicating that the older the FtM were, the less body dissatisfied they were and the less they strove for muscularity (Table 5).

Correlations between Body Mass Index and Measures of Body Image and Eating Disturbances

For the MtF, significant correlations were found between the BMI and the four subscales of the Eating Disorder Examination Questionnaire as well as between the three subscales of the Eating Disorder Inventory. These correlations indicate that the higher the BMI, the stronger the degree of body image and eating disorder problems in this group. Furthermore, the correlation between BMI and the Drive for Muscularity Scale was significant, indicating that the higher the BMI, the less the participants strove for muscularity. For the FtM, significant correlations between BMI and the two Eating Disorder Inventory subscales Drive for Thinness and Bulimia were found. These correlations indicate that the higher the BMI, the more FtM strove for thinness and displayed bulimic behavior (Table 5).

Correlations between the Number of Stages of Transsexual Development Undergone and Measures of Body Image and Eating Disturbances

For MtF and FtM, no significant correlations were found for the number of stages undergone in the transsexual development with the measures of eating and body image disturbance (Table 5).

Discussion

The main aim of the present study was to determine whether MtF and FtM differed from controls of both sexes and persons with eating disorders in the extent of eating and body image disturbances. As hypothesized, it was shown that MtF displayed higher degrees of restrained eating, concerns about eating, weight and shape, drive for thinness, bulimic behavior, body dissatisfaction, and body checking than did male controls. Compared to female controls, who generally show higher degrees of eating disturbance and body image problems than males (Feingold & Mazzella, 1998; Hoek & van Hoeken, 2003), the scores of MtF still exceeded those of female controls in weight and shape concerns, body dissatisfaction, and body checking behavior. These results, showing a higher degree of disturbed eating behavior and body image among MtF compared to controls of both sexes, might be explained by the fact that, on average, these persons have a higher BMI than biological females. In order to attain a more feminine and thus a thinner body, MtF might experience pressure to lose body weight, and thus display a higher cognitive control on food intake, resulting in an overconcern with eating, weight, and shape. Since restrained eating patterns enhance the risk of the occurrence of binge eating symptoms (Byrne & McLean, 2002), the higher scores in bulimia in the MtF compared to male controls might be due to a more pronounced food deprivation status. The finding of the enhanced degree of body dissatisfaction among MtF might be explained by the discrepancy between their own larger biological male shape and the ideal thinner feminine figure.

For the FtM group, results indicated a higher degree of restrained eating patterns, weight and shape concerns, body dissatisfaction, and body checking behavior compared to male controls. It can be speculated that this result is due to the observation that FtM try to reduce body weight in order to

Table 5 Correlations between measures of eating and body image disturbance and general adjustment, age, Body Mass Index and stages of transsexual development undergone

Variable		General Adjustment Index		Age		Body Mass Index		Stages of transsexual development undergone	
		Male-to-female transsexuals ($n = 88$)	Female-to-male transsexuals ($n = 43$)	Male-to-female transsexuals ($n = 88$)	Female-to-male transsexuals ($n = 43$)	Male-to-female transsexuals ($n = 88$)	Female-to-male transsexuals ($n = 43$)	Male-to-female transsexuals ($n = 88$)	Female-to-male transsexuals ($n = 43$)
Eating Disorder Examination Questionnaire									
Restraint	r	−.32	−.04	.27	−.07	.23	.25	−.09	−.02
	p	.002	ns	.012	ns	.029	.106	ns	ns
Eating concern	r	−.41	−.19	.20	−.12	.34	.21	−.08	−.04
	p	<.001	ns	.057	ns	.001	.181	ns	ns
Weight concern	r	.54	−.26	.08	−.15	.46	.28	−.08	−.01
	p	<.001	.092	ns	ns	<.001	.070	ns	ns
Shape concern	r	−.50	−.26	.04	−.23	.45	.23	−.05	−.11
	p	<.001	.099	ns	ns	<.001	ns	ns	ns
Eating Disorder Inventory									
Drive for Thinness	r	−.48	−.18	.02	−.16	.35	.32	−.09	−.06
	p	<.001	ns	ns	ns	.001	.040	ns	ns
Bulimia	r	−.40	−.26	−.16	−.18	.21	.38	−.19	.082
	p	<.001	.090	ns	ns	.05	.011	.074	ns
Body Dissatisfaction	r	−.40	−.30	−.14	−.57	.37	.29	−.12	−.12
	p	<.001	.055	ns	<.001	<.001	.062	ns	ns
Body Checking Questionnaire	r	−.45	−.18	−.17	.05	.01	.06	−.17	−.29
	p	<.001	ns	ns	ns	ns	ns	ns	.057
Drive for Muscularity Scale	r	−.06	−.28	−.33	−.55	−.25	−.18	−.12	.05
	p	ns	.071	.002	<.001	.020	ns	ns	ns

suppress the secondary sexual characteristics (Fernandez-Aranda et al., 2000; Hepp & Milos, 2002). However, one could also assume that some FtM might try to avoid losing weight or even to put on weight in order to avert sexual attraction for being a woman from men or to gain weight so as to reduce the prominence of breast and hip girth compared to abdominal girth.

Nevertheless, in contrast to MtF, who seem to be at an even higher risk for eating and body image disturbances than females without GID, FtM did not differ from female controls in this regard. Possibly, the lack of difference between FtM and female controls in body image and eating disturbance might be explained by the assumption that the desire to lose weight among FtM in order to get rid of the female secondary sexual characteristics balances out the drive for thinness among females in order to fulfill the sociocultural slimness ideal for females of Western societies (Sypeck, Gray, & Ahrens, 2004).

A comparison between the MtF and FtM participants revealed that MtF performed more body checking than did FtM. Contrary to expectation, no further differences between the two groups emerged. This result was not in line with the findings by Pauly and Lindgren (1976/1977), who found a higher degree of body dissatisfaction among MtF compared to FtM. This discrepancy between the two studies might be due to methodological aspects, since Pauly and Lindgren (1976/1977) used figure drawings for the assessment of attitudes towards one's own body, whereas in the present study, body dissatisfaction was measured using the Eating Disorder Inventory, primarily focusing on the evaluation of certain body parts.

Although participants with GID in general had higher values than the male and female controls on body image measures, both MtF and FtM showed a significantly lower degree of body image and eating disorder pathology on each scale compared to the females with eating disorders. Since no cut-off values have been established for the eating disorder and body image questionnaires we used, we cannot determine whether our participants with GID exceed a critical threshold for a pathological eating behavior and body image disturbance. However, if we consider the mean values of the Eating Disorder Examination Questionnaire, the Eating Disorder Inventory, the Body Checking Questionnaire and the Drive for Muscularity Scale which have been published in the validation studies of these instruments, we find that most of the means of the MtF and FtM in our sample were within one SD of the mean values of healthy population and below one SD of populations with eating disorders. Furthermore, we did not find that individuals with GID of either sex had lower self-esteem than either male controls or female controls, which is in line with previous research (Beatrice, 1985; Bodlund & Armelius, 1994). Also, considering the more negative body image variables in the two GID groups, it can be hypothesized that sources other than the physical appearance might contribute to the self-esteem of MtF and FtM.

In contrast to earlier works that reported similar degrees of affective disorders in persons with GID to the general population (Cohen et al., 1997; Cole, O'Boyle, Emory, & Meyer, 1997), the data of the present study revealed higher depression scores for MtF and FtM compared to male controls and for MtF also compared to female controls. However, comparing the depression scores of the participants with GID with the norms (Hautzinger et al., 2000), the mean values of MtF as well as of FtM were, although significantly higher than those of the controls, not in the clinical range. When dividing the samples of MtF and FtM into two groups according to the norms of the questionnaire, the data indicate that approximately a quarter of the MtF and a sixth of the FtM display a clinically relevant depression score. It is open to discussion whether the slightly higher degree of depression in persons with GID is causally linked with the development of GID or whether it can be regarded as a secondary phenomenon arising as a reaction to stress associated with adjusting to a cross-gender identity (Cohen et al., 1997). Furthermore, it can be speculated that the higher degree of psychopathology in the participants with GID is due to social stigma. Future research using a longitudinal study design should be conducted in order to clarify this issue.

Our correlational data indicated that, among MtF, the general adjustment index, comprising self-esteem and depression, was significantly associated with each of the scales measuring body image and eating disturbance. This finding was in line with previous research on individuals without GID showing that body image and self-esteem are correlated (e.g., Davison & McCabe, 2006; Dobmeyer & Stein, 2003; Dunkley & Grilo, 2007; Freedman, 1990; Taylor & Cooper, 1992; Tomori & Rus-Makovec, 2000). Interestingly, among the FtM, no such relationship was found, indicating that only in MtF is a lower general adjustment associated with a higher degree of body image problems, which might be due to the sociocultural standards for the desired sex, i.e., the slimness ideal for females (Sypeck et al., 2004).

Further analyses examined whether age was associated with the body image variables within the two GID groups. For MtF, it was shown that the older the participants were, the less they displayed restrained eating patterns and the less they strove for muscularity. Similarly, for FtM, the older the participants were, the less body dissatisfied they were and the less they strove for muscularity. These results were only partly in line with previous research on persons without GID, which demonstrated that with increasing age, weight and shape concerns decrease, while the degree of body dissatisfaction remains stable over time (Tiggeman, 2004).

Correlational data for BMI indicate that, for MtF, a higher BMI is associated with more pronounced body image and

eating disturbances on most of the scales we used. These results might be explained by the fact that with a higher BMI, MtF might experience that their body shape deviates from the slenderness ideal for the female population (Feingold & Mazzella, 1998; Sypeck et al., 2004), resulting in a more negative body image, which in turn might be accompanied by compensatory behavior such as restrained eating and bulimic behavior. For FtM, only the correlations between BMI and the scales Drive for Thinness and Bulimia was significant, indicating that in this population, a higher body weight was associated with striving for thinness and compensatory behavior.

Contrary to our expectation, we did not find a correlation between the number of stages of the transsexual development undergone and eating and body image disturbance measures among MtF and FtM. This finding contradicts the results of the above-mentioned studies by Kraemer et al. (2008) and Pauly and Lindgren (1976/1977), in which a positive effect of sex-reassignment surgery on body image was demonstrated. In contrast to these studies, we analyzed the various sex-reassignment procedures in our study together due to the low sample sizes for each stage. In future research, it would be desirable to examine a higher number of MtF and FtM who differ in terms of the stages of transsexual development undergone in order to detect differences in eating disorder and body image disturbances.

Limitations

Although the present study is the first to empirically confirm a relationship between GID and eating and body image disturbances, several limitations have to be considered when interpreting the data. One limitation of the present study was that the participants were self-identified transsexuals and were not diagnosed by the researchers themselves. Therefore, it cannot be taken for granted that each participant fully met the criteria for GID according to the DSM-IV-TR (American Psychiatric Association, 2000). In future studies, an attempt should be made to replicate the results of the present study in a sample of participants who have been diagnosed by a clinician according to these criteria.

A further limitation was the low sample size, which is due to the low prevalence rates of GID. Therefore, multivariate statistics, which might have provided further insights into the interrelations of the various body image and eating disorder variables, could not be applied.

Furthermore, it should be mentioned that some of the questionnaires that we used might not have the same meaning for persons with GID and for persons with eating disorders (for whom most of the questionnaires were originally developed). Therefore, regarding some of the items, it might be problematic to compare persons with GID and controls with and without eating disorders concerning these items. For example, it could be possible that persons with GID may be dissatisfied with their bodies in a way that has few implications for the development of eating disorders. An example might be that an MtF scores low on the item "I feel satisfied with the shape of my body" of the Eating Disorder Inventory because she is dissatisfied with her large shoulders. This person probably would not try to lose weight because this would exaggerate the disproportion. In this light, it would be desirable for future research to develop body image questionnaires especially for populations with GID.

A further limitation of the present study stems from the comparability of the GID groups and control groups included in the present study, since the male and female control groups were primarily composed of participants in university seminars and clerks of the city council. Furthermore, the clinical control group of females with eating disorders differed in educational level from the other samples.

Finally, although we assessed the sex of the current partner for the participants with GID, we did not systematically collect data on sexual orientation from every participant. Since previous research has indicated a relationship among sexual orientation, body image, and eating disorders in persons without GID (e.g., Russell & Keel, 2002; Schneider & Agras, 1987), it would be very interesting to consider this aspect in future studies in order to examine whether the sexual orientation of persons with GID has an influence on the eating disorder and body image symptomatology.

Clinical Implications

The results of the present study provide first indications that persons with GID, especially MtF, might be at an enhanced risk of developing eating and body image disturbances. If the results of the present study can be replicated, it might therefore be helpful to initiate prevention programs for persons with GID. These prevention programs could include psychoeducation concerning the eating disorder pathology, including restrained eating and bingeing behavior (Byrne & McLean, 2002) as well as concerning the medical and psychological complications of disturbed eating patterns (Mitchell & Crow, 2006). Since in our sample, persons with GID also showed a higher degree of body dissatisfaction and body checking behavior, and body image disturbances play a significant role in the development and maintenance of eating disorders (Fairburn et al., 2003; Halmi et al., 2002; Keel et al., 2005; Killen et al., 1996; Stice, 2002), interventions aiming at an improvement of body image might be promising in this context (Cash & Hrabosky, 2004; Vocks, Legenbauer, Wächter, Wucherer, & Kosfelder, 2007; Vocks, Wächter, Wucherer, & Kosfelder, 2008). Future research should develop and evaluate the effects of such prevention programs for persons with GID with regard to eating and body image

disorder. The aim should be to find out which treatment module is most helpful for which persons at which stage of transsexual development in order to prevent these persons from establishing dysfunctional eating patterns that might enhance the risk for a clinically relevant eating disorder.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

Beatrice, J. (1985). A psychological comparison of heterosexuals, transvestites, preoperative transsexuals and postoperative transsexuals. *Journal of Nervous and Mental Disease, 173*, 358–365.

Beck, A. T., & Steer, R. A. (1987). *Beck Depression Inventory-Manual*. San Antonio, TX: The Psychological Corporation.

Bodlund, O., & Armelius, K. (1994). Self-image and personality traits in gender identity disorders: An empirical study. *Journal of Sex and Marital Therapy, 20*, 303–317.

Byrne, S. M., & McLean, N. J. (2002). The cognitive-behavioral model of bulimia nervosa: A direct evaluation. *International Journal of Eating Disorders, 31*, 17–31.

Cafri, G., & Thompson, J. K. (2004). Evaluating the convergence of muscle appearance attitude measures. *Assessment, 11*, 224–229.

Cash, T. F., & Deagle, E. A. (1997). The nature and extent of body-image disturbances in norexia nervosa and bulimia nervosa: A meta-analysis. *International Journal of Eating Disorders, 22*, 107–125.

Cash, T. F., & Hrabosky, J. I. (2004). Treatment of body image disturbances. In J. K. Thompson (Ed.), *Handbook of eating disorders and obesity* (pp. 515–541). Hoboken, NJ: Wiley.

Cohen, L., de Ruiter, C., Ringelberg, H., & Cohen-Kettenis, P. T. (1997). Psychological functioning of adolescent transsexuals: Personality and psychopathology. *Journal of Clinical Psychology, 53*, 187–196.

Cole, C. M., O'Boyle, M., Emory, L. E., & Meyer, W. J. (1997). Comorbidity of gender dysphoria and other major psychiatric disorders. *Archives of Sexual Behavior, 26*, 13–25.

Coughlin, J. W., Edwards, R., Buenaver, L., Redgrave, G., Guarda, A. S., & Haythornthwaite, J. (2008). Pain, catastrophizing, and depressive symptomatology in eating disorders. *Clinical Journal of Pain, 24*, 406–414.

Davison, T. E., & McCabe, M. P. (2006). Adolescent body image and psychosocial functioning. *Journal of Social Psychology, 146*, 15–30.

Dobmeyer, A. C., & Stein, D. M. (2003). A prospective analysis of eating disorder risk factors: Drive for thinness, depressed mood, maladaptive cognitions, and ineffectiveness. *Eating Behaviors, 4*, 135–147.

Dunkley, D. M., & Grilo, C. M. (2007). Self-criticism, low self-esteem, depressive symptoms, and over-evaluation of shape and weight in binge eating disorder patients. *Behaviour Research and Therapy, 45*, 139–149.

Eisen, S. V., Toche-Manley, L. L., & Grissom, G. R. (2004). Computer-administered versus paper-and-pencil mental health surveys. *Psychiatric Services, 55*, 1316–1317.

Errico, A. L., King, A. C., & Parsons, O. A. (1991). The influence of depressive symptomatology on alcoholics' locus of control: A methodological note and a correction. *Journal of Clinical Psychology, 47*, 600–604.

Fairburn, C. G., & Cooper, G. T. (1993). The eating disorder examination. In C. F. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment and treatment* (pp. 317–332). New York: Guilford.

Fairburn, C. G., Stice, E., Cooper, Z., Doll, H. A., Norman, P. A., & O'Connor, M. E. (2003). Understanding persistence in bulimia nervosa: A 5-year naturalistic study. *Journal of Consulting and Clinical Psychology, 71*, 103–109.

Feingold, A., & Mazzella, R. (1998). Gender differences in body image are increasing. *Psychological Science, 9*, 190–195.

Fernandez-Aranda, F., Peri, J. M., Navarro, V., Badla-Casnovas, A., Turon-Gil, V., & Vallejo-Ruiloba, J. (2000). Transsexualism and anorexia nervosa: A case report. *Eating Disorders, 8*, 63–66.

Ferring, D., & Filipp, S.-H. (1996). Messungen des Selbstwertgefühls: Befunde zu Reliabilität, Validität und Stabilität der Rosenberg-Skala [Measurement of self-esteem: Findings on reliability, validity, and stability of the Rosenberg Scale]. *Diagnostica, 42*, 284–292.

Fouladi, R. T., McCarthy, C. J., & Moller, N. P. (2002). Paper-and-pencil or online? Evaluating mode effects on measures of emotional functioning and attachment. *Assessment, 9*, 204–215.

Freedman, R. (1990). Cognitive-behavioral perspectives on body image change. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: Development, deviance and change* (pp. 272–295). New York: Guilford.

Garner, D. M. (1991). *Eating Disorder Inventory-2. Professional manual*. Odessa, FL: Psychological Assessment Resources.

Garner, D. M. (1997). The 1997 body image survey results. *Psychology Today, 30*, 30–84.

Halmi, K. A., Agras, W. S., Mitchell, J., Wilson, G. T., Crow, S., Bryson, S. W., et al. (2002). Relapse predictors of patients with bulimia nervosa who achieved abstinence through cognitive behavioral therapy. *Archives of General Psychiatry, 59*, 1105–1109.

Hautzinger, M., Bailer, M., Worrall, H., & Keller, F. (2000). *Beck-Depressions-Inventar* (*BDI*). *Testhandbuch* (*3. Auflage*) [Beck Depression Inventory (BDI), manual (3rd ed.)]. Bern: Huber.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Orlando, FL: Academic Press.

Hepp, U., & Milos, G. (2002). Gender identity disorder and eating disorder. *International Journal of Eating Disorders, 32*, 473–478.

Hilbert, A., Tuschen-Caffier, B., Karwautz, A., Niederhofer, H., & Munsch, S. (2007). Eating Disorder Examination–Questionnaire—Evaluation der deutschsprachigen Übersetzung Eating Disorder Examination-Questionnaire—Evaluation of the German translation. *Diagnostica, 53*, 144–154.

Hoek, H. W., & van Hoeken, D. (2003). Review of the prevalence and incidence of eating disorders. *International Journal of Eating Disorders, 34*, 383–396.

Hospers, H. J., & Jansen, A. (2005). Why homosexuality is a risk factor for eating disorders in males. *Journal of Social and Clinical Psychology, 24*, 1188–1201.

Jacobi, C., Hayward, C., de Zwaan, M., Kraemer, H. C., & Agras, W. S. (2004). Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin, 130*, 19–65.

Keel, P. K., Dorer, D. J., Franko, D. L., Jackson, S. C., & Herzog, D. B. (2005). Postremission predictors of relapse in women with eating disorders. *American Journal of Psychiatry, 162*, 2263–2268.

Killen, J. D., Taylor, C. B., Hayward, C., Haydel, K. F., Wilson, D. M., Hammer, L., et al. (1996). Weight concerns influence the development of eating disorders: A 4-year prospective study. *Journal of Consulting and Clinical Psychology, 64*, 936–940.

Kraemer, B., Delsignore, A., Schnyder, U., & Hepp, U. (2008). Body image and transsexualism. *Psychopathology, 41*, 96–100.

McCreary, D. R., & Sasse, D. K. (2000). An exploration of the drive for muscularity in adolescent boys and girls. *Journal of American College Health, 48*, 297–304.

Mitchell, J., & Crow, S. (2006). Medical complications of anorexia nervosa and bulimia nervosa. *Current Opinion in Psychiatry, 19*, 438–443.

Olivardia, R. (2001). Mirror, mirror on the wall, who's the largest of them all? The features and phenomenology of muscle dysmorphia. *Harvard Review of Psychiatry, 9*, 254–259.

Olivardia, R. (2002). Body image and muscularity. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 210–218). New York: Guilford Press.

Paul, T., & Thiel, A. (2005). *EDI-2 Eating Disorder Inventory-2, Deutsche version, manual [EDI-2 Eating Disorder Inventory-2, German version, manual]*. Göttingen: Hogrefe.

Pauly, I. B., & Lindgren, T. W. (1976/1977). Body image and gender identity. *Journal of Homosexuality, 2*, 133–134.

Reas, D. L., Whisenhunt, B. L., Netemeyer, R., & Williamson, D. A. (2002). Development of the Body Checking Questionnaire: A self report measure of body checking behaviors. *International Journal of Eating Disorders, 31*, 324–333.

Riva, G., Teruzzi, T., & Anolli, L. (2003). The use of the internet in psychological research: Comparison of online and offline questionnaires. *Cyber Psychology & Behavior, 6*, 73–80.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.

Russell, C., & Keel, P. (2002). Homosexuality as a specific risk factor for eating disorders in men. *International Journal of Eating Disorders, 31*, 300–306.

Schneider, J. A., & Agras, W. S. (1987). Bulimia in males: A matched comparison with females. *International Journal of Eating Disorders, 6*, 235–242.

Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin, 128*, 825–848.

Sypeck, M. F., Gray, J. J., & Ahrens, A. H. (2004). No longer just a pretty face: Fashion magazines' depictions of ideal female beauty from 1959–1999. *International Journal of Eating Disorders, 36*, 342–347.

Taylor, M. J., & Cooper, P. J. (1992). An experimental study of the effect of mood on body size perception. *Behaviour Research and Therapy, 30*, 53–58.

Tiggeman, M. (2004). Body image across the adult life span: Stability and change. *Body Image, 1*, 29–41.

Tomori, M., & Rus-Makovec, M. (2000). Eating behavior, depression, and self-esteem in high school students. *Journal of Adolescent Health, 26*, 361–367.

Vocks, S., Legenbauer, T., Wächter, A., Wucherer, M., & Kosfelder, J. (2007). What happens in the course of body exposure? Physiological, cognitive and affective reactions to mirror confrontation in eating disorders. *Journal of Psychosomatic Research, 62*, 231–239.

Vocks, S., Moswald, C., & Legenbauer, T. (2008). Psychometrische Überprüfung der deutschsprachigen Fassung des Body Checking Questionnaire (BCQ) [Psychometric revision of the German version of the Body Checking Questionnaire (BCQ)]. *Zeitschrift für Klinische Psychologie und Psychotherapie, 37*, 131–140.

Vocks, S., Wächter, A., Wucherer, M., & Kosfelder, J. (2008). Look at yourself: How does body image therapy affect emotional and cognitive reactions to seeing oneself in the mirror in eating disorders? *European Eating Disorders Review, 16*, 147–154.

Waters, J. (1998). The razor edge: Walking the fine line of the self. In D. Atkins (Ed.), *Looking queer: Body image and identity in lesbian, bisexual, gay and transgendered communities* (pp. 181–187). Binghamton, NY: Haworth Press.